Justification for Normalized Relational Schemas

By following the process of converting E/R diagram to relational designs:

First, 8 entities in the ER (Orders, Customer, Restaurant, RestaurantBankAccount, Driver, DriverBankAccount, CreditCard, FoodInOrder, Food) are converted into its own relation.

Second, 8 relationships are replaced with relations (placedBy, paidWith, contains, providedBy, preparedBy, assignedTo, ownedBy \* 2).

Third, 7 relations converted from n-1 relationships (placedBy, paidWith, providedBy, preparedBy, assignedTo, ownedBy \* 2) are combined into the entity relations on “n” side.

Then, we merge RestaurantBankAccount and DriverBankAccount into one table BankAccount. Since their attributes are identical.

In total, we end up with (8+8-7-1 = 8) relations.

Below, we show that every table is in 3NF:

R1) Relation 1 contains the information about the orders placed for the food. Each order is assigned a unique order ID to be identified by. All attributes are dependent on said order ID, so it is a key (superkey) which satisfies the 3NF.

R2) Relation 2 contains the information about each customer. Each customer is assigned a unique customer ID to be identified by. All attributes are dependent on said customer ID, so it is a key (superkey) which satisfies the 3NF.

R3) Relation 3 contains the information about each restaurant. Each restaurant is assigned a unique restaurant ID to be identified by. All attributes are dependent on said restaurant ID, so it is a key (superkey) which satisfies the 3NF.

R4) Relation 4 contains the information about each driver. Each driver is assigned a unique driver ID to be identified by. All attributes are dependent on said driver ID, so it is a key (superkey) which satisfies the 3NF.

R5) Relation 5 contains the information about each driver’s bank account. Each account is assigned a unique driver ID to be identified by. All attributes are dependent on said driver ID, so it is a key (superkey) which satisfies the 3NF.

R6) Relation 6 contains the information about the credit card used by each customer. Each credit card is assigned a unique CC number to be identified by. All attributes are dependent on said number, so it is a key (superkey) which satisfies the 3NF.

R7) Relation 7 contains the information about the ordered food and its quantity in each order. Each food quantity is identified by both orderID and foodID. All attributes are dependent on said orderID and foodID, so they are a key (superkey) which satisfies the 3NF.

R8) Relation 8 contains the information about food associated with a restaurant. Each food is assigned a unique number to be identified by. All attributes are dependent on said number, so it is a key (superkey) which satisfies the 3NF.